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| APPLICATION NO | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO | CONFIRMATION NO |
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| 09/248,392 | 02/12/1999 | HUBERTUS ALEXANDER SPAEPEN | GB97/023 | 8699 |

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| EXAMINER | |
|---|---|
| LISH, PETER J | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1754 | |

DATE MAILED: 01/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Application No. | Applicant(s) |
|---|---|
| 09/248,392 | SPAEPEN, HUBERTUS ALEXANDER |
| **Examiner** | **Art Unit** |
| Peter J Lish | 1754 |

# Office Action Summary

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133)
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on 23 October 2003.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) 1-21 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-21 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a)☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other

## DETAILED ACTION

Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Applicant's argument that one of ordinary skill in the art would not envision a channel, as claimed by applicant, wherein reactants enter and the product leaves on a continuous or semi-continuous basis is not persuasive. It is examiner's position that in a continuous process, the reactants enter and the products leave on a continuous basis, therefore, upon modification of the process of Kosin '160 in order to yield a continuous process, one of ordinary skill would envision a channel where reactants enter and a channel where products leave on a continuous basis.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### *Claim Rejections - 35 USC § 103*

Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kosin '160.

Kosin et al. discloses a carbonation process for producing calcium carbonate from calcium hydroxide derived from limestone which provides improved utilization of the carbon dioxide gas used for the carbonation process (col. 3, ln. 12-16). An aqueous calcium hydroxide slurry is provided in the reaction vessel and is recirculated through the recycle piping system. The calcium hydroxide slurry may be prepared in any manner known in the art. The slurry preferably has a solid content of from about 10 to about 20 weight percent. Higher amounts within this range allow the precipitated products to cluster together (col. 4., ln. 3-15). At least a

portion of the aqueous slurry is continuously recirculated through the recycle piping system. The carbon dioxide containing gas is injected into the recirculating aqueous slurry at a turbulent area located in the recycle piping system (col. 4, ln. 17-21). The injection of the carbon dioxide containing gas at a turbulent area in the recycle piping system provides intimate mixing of the gas and the recirculating stream, and the carbon dioxide utilization in the final calcium carbonate compound product approaches 100% (col. 3, ln. 54-59). Preferably, there is at least one of the in-line mixers (38, 40) located in the recycle piping system downstream of the turbulent area, for example the piping bend (32 a), where the carbon dioxide is injected into the recirculating stream. The in-line mixer provides further intimate mixing of the gas and recirculating stream (col. 3, ln. 64-68 to col. 4, ln. 1-2).

Kosin et al. does not disclose that the process is continuous or semi-continuous; however, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply a continuous or semi-continuous process to that of Kosin et al because it is well within the expected skill of the technician to operate the process continuously or semi-continuously. See *In re Dilnot*, 138 U.S.P Q. 248, 252.

Kosin et al does not disclose the use of 3 or more, such as 4 to 7, in-line static mixers, however, one of ordinary skill in the art at the time the invention was made would use 3 or more, such as 4 to 7, in-line static mixers in the process of Kosin et al because more in-line static mixers increases the rate and efficiency of thoroughly mixing the carbon dioxide and the aqueous calcium hydroxide slurry. Kosin et al also does not disclose that the aqueous suspension and/or the carbon dioxide enter the first of the series of mixers at a pressure in the range of 50 kPa to 150 kPa or that the hydraulic pressure of the aqueous suspension and/or carbon dioxide

progressively falls as it passes through the series of static in-line mixers, however, one of ordinary skill in the art at the time the invention was made would optimize the hydraulic pressure throughout the process, especially at the static in-line mixers, in order to provide a continuous flow of products as well as intimate mixing. It is also well known in the art that hydraulic pressure falls as it flows through piping, mixers, conduits, bends, etc.

Kosin '160 does not teach that carbon dioxide is independently supplied to each mixing site from a common source or using independent pressure control; however, it would have been obvious to one of ordinary skill in the art to do so in view of good process control technique since independent supply of carbon dioxide to each mixing site would result in better controlling the rate at which calcium carbonate product is produced.

Claims 13-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kosin '160 as applied to claims 1-12 above, and further in view of EP 604,095 A1.

Kosin '160 does not disclose that the aqueous suspension includes non-consumable solids such as fibers or particles. However, EP 604,095 A1 teaches an aqueous suspension of particulate waste material, which comprises the step of precipitating an alkaline earth metal carbonate in the said aqueous suspension of the particulate material whereby the said particulate material present at the start of the process becomes entrained in the alkaline earth metal carbonate precipitate (see abstract). The aggregated product of such a process, which have advantageous properties when used in papermaking or paper coating, or when used as a filler or extender for paints, plastics compositions, and the like. The waste material is a by-product of wet-mineral refining processes and wastewaters from paper mills (see page 2, lines 1-3). The

aqueous suspension is preferably dilute, which contains no more than about 20% by weight of the dry particulate material based on a dry weight basis, more preferably less than 10% by weight thereof (see page 3, lines 4-7). The particulate material is an industrial by-product such as finely divided kandite clay mineral such as kaolin, a smectite clay such as bentonite, montmorillonite, saponite, hectorite or beidellite, and paper mill (see page 3, lines 8-1 1). The alkaline earth metal is preferably calcium carbonate. The alkaline earth metal carbonate precipitate may be formed by introducing into the suspension of the particulate mineral a source of alkaline earth metal ions and a source of carbonate ions. This will form the desired precipitate of alkaline earth metal carbonate in situ, which will entrain the particulate mineral (page 3, lines 26-30).

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use non-consumable solids, such as fibers or particles, in the process of Kosin because EP 604 095 teaches that the aggregated product, calcium carbonate, of such a process would have advantageous properties when used in paper making or paper coating, or when used as a filler or extender for paints, plastics compositions, and the like, and EP '095 suggests that such non-consumable solids may be employed in a process that precipitates calcium carbonate using a source of carbonate ions and alkaline earth metal ions, which Kosin provides using carbon dioxide and a calcium hydroxide slurry.

Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ota et al. (US 4,824,654) in view of Bleakly et al (US 5,342,600) alone or further in view of Kosin et al. '160.

Ota teaches a continuous process for the production of precipitated calcium carbonate by the reaction of a calcium hydroxide solution and carbon dioxide gas. The process comprises continuously adding aqueous calcium hydroxide solution, continuously adding carbon dioxide gas, and continuously withdrawing the products. Ota does not teach a process of mixing the carbon dioxide into the aqueous solution.

Bleakley teaches a process for the production of precipitated calcium carbonate by the reaction of a calcium hydroxide solution and carbon dioxide gas. Bleakly teaches the use of a continuous agitation of the solution during the carbonation step. The main aim of the agitation is to maintain the suspension in a substantially disturbed condition and hence promote contact between the calcium hydroxide and carbon dioxide reactant media. Bleakly additionally teaches that the carbon dioxide is preferably admitted into the suspension in the form of fine bubbles in order to promote mixing.

It would have been obvious to perform the continuous process of Ota et al. using a continuous agitation during the process of carbonation, as taught by Bleakley, in order to provide efficient mixing of the reactant media and thereby produce a higher yield of products.

Neither Ota et al. nor Bleakley et al. explicitly teaches the use of static in-line mixers. However, official notice is taken that static in-line mixers are known in the art. It would have been obvious to one of ordinary skill at the time of invention to use a series of static in-line mixers in order to provide the disturbed condition required by Bleakley et al.

Alternatively, Kosin et al. teaches a process for the production of precipitated calcium carbonate by the reaction of a calcium hydroxide solution and carbon dioxide gas. Kosin teaches the use of a series of static in-line mixers in order to maintain the suspension in a turbulent

condition and hence promote contact between the calcium hydroxide and carbon dioxide reactant media. It would have been obvious to one of ordinary skill at the time of invention to use a series of static in-line mixers, as taught by Kosin et al., in the process of Ota et al. in view of Bleakley et al. in order to provide the disturbed condition required by Bleakley et al.

Neither Bleakley et al. nor Kosin et al. disclose the use of 3 or more, such as 4 to 7, in-line static mixers, however, one of ordinary skill in the art at the time the invention was made would use 3 or more, such as 4 to 7, in-line static mixers in the process of Bleakley et al. because more in-line static mixers increases the rate and efficiency of thoroughly mixing the carbon dioxide and the aqueous calcium hydroxide slurry. Neither Bleakley et al. nor Kosin et al. disclose that the aqueous suspension and/or the carbon dioxide enter the first of the series of mixers at a pressure in the range of 50 kPa to 150 kPa or that the hydraulic pressure of the aqueous suspension and/or carbon dioxide progressively falls as it passes through the series of static in-line mixers; however, one of ordinary skill in the art at the time the invention was made would optimize the hydraulic pressure throughout the process, especially at the static in-line mixers, in order to provide a continuous flow of products as well as intimate mixing. It is also well known in the art that hydraulic pressure falls as it flows through piping, mixers, conduits, bends, etc.

Neither Bleakley et al. nor Kosin et al. teach that carbon dioxide is independently supplied to each mixing site from a common source or using independent pressure control; however, it would have been obvious to one of ordinary skill in the art to do so in view of good process control technique since independent supply of carbon dioxide to each mixing site would result in better controlling the rate at which calcium carbonate product is produced.

Claims 13-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ota et al. in view of Bleakley et al. either alone or further in view of Kosin '160 as applied to claims 1-12 above, and further in view of EP 604,095 A1.

Ota et al. does not disclose that the aqueous suspension includes non-consumable solids such as fibers or particles. However, EP 604,095 A1 teaches an aqueous suspension of particulate waste material, which comprises the step of precipitating an alkaline earth metal carbonate in the said aqueous suspension of the particulate material whereby the said particulate material present at the start of the process becomes entrained in the alkaline earth metal carbonate precipitate (see abstract). The aggregated product of such a process, which have advantageous properties when used in papermaking or paper coating, or when used as a filler or extender for paints, plastics compositions, and the like. The waste material is a by-product of wet-mineral refining processes and wastewaters from paper mills (see page 2, lines 1-3). The aqueous suspension is preferably dilute, which contains no more than about 20% by weight of the dry particulate material based on a dry weight basis, more preferably less than 10% by weight thereof (see page 3, lines 4-7). The particulate material is an industrial by-product such as finely divided kandite clay mineral such as kaolin, a smectite clay such as bentonite, montmorillonite, saponite, hectorite or beidellite, and paper mill (see page 3, lines 8-1 1). The alkaline earth metal is preferably calcium carbonate. The alkaline earth metal carbonate precipitate may be formed by introducing into the suspension of the particulate mineral a source of alkaline earth metal ions and a source of carbonate ions. This will form the desired precipitate

of alkaline earth metal carbonate in situ, which will entrain the particulate mineral (page 3, lines 26-30).

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use non-consumable solids, such as fibers or particles, in the process of Ota et al. because EP 604 095 teaches that the aggregated product, calcium carbonate, of such a process would have advantageous properties when used in paper making or paper coating, or when used as a filler or extender for paints, plastics compositions, and the like, and EP '095 suggests that such non-consumable solids may be employed in a process that precipitates calcium carbonate using a source of carbonate ions and alkaline earth metal ions, which Ota et al provides using carbon dioxide and a calcium hydroxide slurry.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter J Lish whose telephone number is 571-272-1354. The examiner can normally be reached on 9:00-6:00 Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

PL

STUART L. HENDRICKSON
PRIMARY EXAMINER